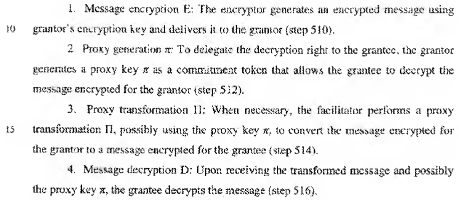
REMARKS

Claims 1-15 and 18-33 are pending in this application, and claims 1 and 15 are amended herein. Based on the discussions during the telephonic Interview of August 2, 2006, the Amendments presented above, and the following remarks, Applicants respectfully request reconsideration and allowance of this application.

Claims 1, 4-7, 12-15, 19-21, 24-25, and 27-33 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,084,969 to Wright et al. Applicant respectfully traverses this rejection, because Wright et al. fails to teach each and every element recited by the claims. For example, claim 1 recites a method for encrypting an original message to be passed to a recipient by way of a grantor, the method comprising the steps of obtaining an encrypted message representative of the original message, the encrypted message having been encrypted with a public key corresponding to the grantor according to a public key encryption scheme, generating a public proxy key based on a private key corresponding to the recipient and on the private key corresponding to said grantor, wherein said grantor's private key and said recipient's private key are combined, and the combination of the private keys is based on said public key encryption scheme and provides that it is computationally difficult to recover the recipient's private key from the public proxy key even with the knowledge of the grantor's private key, and applying the public proxy key to the encrypted message to transform the encrypted message into a transformed message, wherein the transformed message is decryptable by the recipient using information selected from the private key corresponding to the recipient and the available public key information, and wherein *the encrypted message remains in an encrypted state while being transformed into the transformed message and is not decrypted to the original message and re-encrypted at any point during the transformation.*

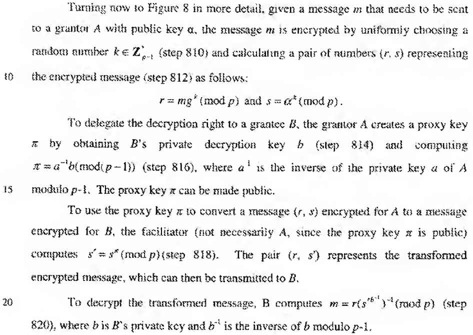
As was discussed in the Interview, Wright teaches a well-known decryption / re-encryption method including "using a pager proxy to carry out decryption of a message encrypted by a session key and received from the sending pager, and to have the pager proxy generate a new session key for re-encryption of the message transmitted to the receiving pager. . ." (Col. 4, line 65-Col. 5, line 2). According to Wright, the encrypted message does not remain encrypted during application of a new key to the message. In particular, Wright teaches, in Col. 13, line 45, to Col. 14, line 30, the steps of encrypting a message with a session key (step 170), transmitting the encrypted message to the pager proxy (see FIG. 8), decrypting the message using the session key (step 240), generating a new session key (step 300), and re-encrypting the message using the new session key (step 310). It is noted that the Examiner also points to column 14, lines 61-67 of Wright et al., which state that "although the preferred embodiment of the invention has the pager proxy re-package the message by first decrypting it, and then re-encrypting it using a new session key, it is also within the scope of the invention to have the pager proxy decrypt only the session key and re-encrypt the same session key using the public key or shared secret key of the destination pager." The Examiner further points to Col. 13, lines 2-15, of Wright and suggests that Wright teaches a method of encrypting a message and the subsequently further encrypting the message with a second encryption for the message without decrypting the message during the transformation. However, neither of these portions of Wright discloses applying a public proxy key to an encrypted message to transform the encrypted message into a transformed message, wherein the transformed message is decryptable by the recipient using information selected from the private key corresponding to the recipient and the available public key information, and wherein the encrypted message remains in an encrypted state while being transformed into the transformed message and is not decrypted to the original message and re-encrypted at any point during the transformation, as is recited in the claims. Accordingly, Wright fails to disclose, suggest, or render obvious the noted features recited in the claims.

In contrast to the teachings of Wright, the Examiner's attention is respectfully directed to FIGS. 5, 8-10, and 13, and related discussions on pages 21, 29-34, and 39-43 of the specification, which clearly supports the claims. FIG. 5, and page 21, lines 5-18, of the Specification, clearly disclose the broad concept of the invention, which comprises four generic steps: message encryption, proxy key generation, proxy transformation, and message decryption. These steps are outlined below, with reference to FIG. 5.



> 1. Message encryption E: The encryptor generates an encrypted message using grantor's encryption key and delivers it to the grantor (step 510).
>
> 2. Proxy generation π: To delegate the decryption right to the grantee, the grantor generates a proxy key π as a commitment token that allows the grantee to decrypt the message encrypted for the grantor (step 512).
>
> 3. Proxy transformation Π: When necessary, the facilitator performs a proxy transformation Π, possibly using the proxy key π, to convert the message encrypted for the grantor to a message encrypted for the grantee (step 514).
>
> 4. Message decryption D: Upon receiving the transformed message and possibly the proxy key π, the grantee decrypts the message (step 516).

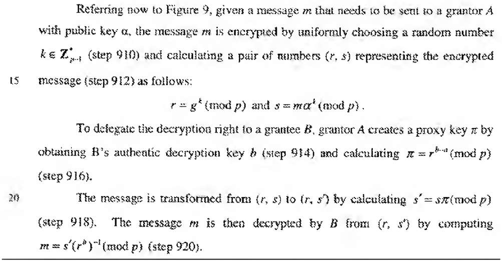
The transformation step recited in the claims is more specifically described with reference to the Blaze and Straus encryption scheme in FIG. 8, and on pages 29-30 of the Specification. In particular, lines 7-21 on page 29 provide that:



> Turning now to Figure 8 in more detail, given a message m that needs to be sent to a grantor A with public key α, the message m is encrypted by uniformly choosing a random number $k \in \mathbf{Z}^{*}_{p-1}$ (step 810) and calculating a pair of numbers (r, s) representing the encrypted message (step 812) as follows:
>
> $$r = mg^{k} (\mathrm{mod}\, p) \text{ and } s = \alpha^{k} (\mathrm{mod}\, p).$$
>
> To delegate the decryption right to a grantee B, the grantor A creates a proxy key π by obtaining B's private decryption key b (step 814) and computing $\pi = a^{-1}b(\mathrm{mod}(p-1))$ (step 816), where a^{1} is the inverse of the private key a of A modulo p-1. The proxy key π can be made public.
>
> To use the proxy key π to convert a message (r, s) encrypted for A to a message encrypted for B, the facilitator (not necessarily A, since the proxy key π is public) computes $s' = s^{\pi} (\mathrm{mod}\, p)$ (step 818). The pair (r, s') represents the transformed encrypted message, which can then be transmitted to B.
>
> To decrypt the transformed message, B computes $m = r(s'^{b^{-1}})^{-1} (\mathrm{mod}\, p)$ (step 820), where b is B's private key and b^{-1} is the inverse of b modulo p-1.

Here, the transformation of the encrypted message occurs in step 818 when the proxy key is applied to the encrypted message (*r,s*), encrypted for A, to transform the encrypted message into a transformed message (*r,s'*), encrypted for B. Contrary to the teachings of Wright, it is possible for an untrusted facilitator or server to perform the proxy transformation. (Pg. 30, lines 9-10).

Similarly, FIG. 9, and related text on page 31 of the Specification, illustrates the transformation step recited in the claims with reference to the ElGamal encryption scheme. In particular, lines 12-22 on page 31 provide:



Referring now to Figure 9, given a message m that needs to be sent to a grantor A with public key α, the message m is encrypted by uniformly choosing a random number $k \in \mathbf{Z}^*_{p-1}$ (step 910) and calculating a pair of numbers (r, s) representing the encrypted message (step 912) as follows:

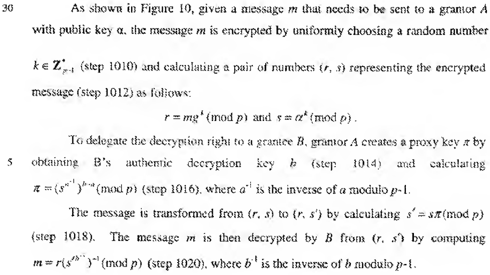
$$r = g^k \pmod p \text{ and } s = m\alpha^k \pmod p .$$

To delegate the decryption right to a grantee B, grantor A creates a proxy key π by obtaining B's authentic decryption key b (step 914) and calculating $\pi = r^{b-a} \pmod p$ (step 916).

The message is transformed from (r, s) to (r, s') by calculating $s' = s\pi \pmod p$ (step 918). The message m is then decrypted by B from (r, s') by computing $m = s'(r^b)^{-1} \pmod p$ (step 920).

Here, the transformation of the encrypted message (*r,s*) to transformed message (*r,s'*) occurs in step 918 when the proxy key is applied to the encrypted message (*r,s*) to transform the encrypted message into the transformed message (*r,s'*).

In addition, FIG. 10, and related text on pages 32-33 of the Specification, describes another embodiment of the invention utilizing the transformation step recited in the claims. In particular, line 30, on page 32, to line 9, on page 32, provides:



As shown in Figure 10, given a message m that needs to be sent to a grantor A with public key α, the message m is encrypted by uniformly choosing a random number $k \in \mathbf{Z}^*_{p-1}$ (step 1010) and calculating a pair of numbers (r, s) representing the encrypted message (step 1012) as follows:

$$r = mg^k \pmod p \text{ and } s = \alpha^k \pmod p .$$

To delegate the decryption right to a grantee B, grantor A creates a proxy key π by obtaining B's authentic decryption key b (step 1014) and calculating $\pi = (s^{a^{-1}})^{b-a} \pmod p$ (step 1016), where a^{-1} is the inverse of a modulo p-1.

The message is transformed from (r, s) to (r, s') by calculating $s' = s\pi \pmod p$ (step 1018). The message m is then decrypted by B from (r, s') by computing $m = r(s'^{b^{-1}})^{-1} \pmod p$ (step 1020), where b^{-1} is the inverse of b modulo p-1.

Here, the transformation of the encrypted message (*r,s*) to transformed message (*r,s'*) occurs in step 1018 when the proxy key is applied to the encrypted message (*r,s*) to transform the encrypted message into the transformed message (*r,s'*).

Accordingly, the methods recited in the claims including the application of the public proxy key to the encrypted message to transform the encrypted message into a transformed message, wherein the transformed message is decryptable by the recipient using information selected from the private key corresponding to the recipient and the available public key information, and wherein the encrypted message remains in an encrypted state while being transformed into the transformed message and is not decrypted to the original message and re-encrypted at any point during the transformation, is clearly and specifically supported by the Specification as is described above.

Accordingly, for at least the reasons described above, Wright fails to disclose each and every element recited in independent claims 1 and 15, including the steps of generating a public proxy key and applying the public proxy key as recited by claims 1 and 15. Thus, Applicants respectfully submit that Wright fails to anticipate claims 1 and 15 under 35 U.S.C. § 102(e), and respectfully request that this rejection be reconsidered and withdrawn. Dependent claims 4-7, 12-14, 19-21, 24-25, and 27-33 are allowable on the basis of their dependency on claims 1 and 15, as well as on their own merits.

Claims 2-3, 8-11, and 22-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wright in view of U.S. Pat. No. 5,748,736 to Mittra. Applicants respectfully submit that dependent claims 2-3, 8-11, and 22-23 are allowable, since they depend on allowable claims 1 and 15. Applicants also respectfully traverse this rejection, because Mittra fails to disclose the encryption scheme as recited in claims 2, 3, 22, and 23. In particular, dependent claims 2, 3, 22, and 23 recite that the encrypted message has been encrypted with an ElGamal or a modified ElGamal encryption scheme. The Examiner concedes that Wright "fails to include an ElGamal encryption scheme" and relies upon Mittra to cure this deficiency. (See Office Action, p. 8). However, Mittra discloses only the use of the "ElGamal signature scheme" and not an ElGamal encryption scheme. (See Mittra, col. 10, line 67.) The ElGamal encryption scheme (a non-deterministic encryption using a public key relying upon digital logarithm) is used for encryption purposes while the ElGamal signature scheme is for source authentication and sender non-reputation purposes. The

ElGamal encryption scheme and the ElGamal signature scheme employ different algorithms and computations and are not the same. Therefore, Applicants respectfully submit that the cited references fail to disclose all the elements recited in dependent claims 2, 3, 22, and 23. Thus, Applicants restfully request that this rejection be reconsidered and withdrawn.

Claims 18 and 26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Wright et al., in further view of Irish Times "Encryption Technology to Thwart Computer Hackers System Should Protect Security of E-Commerce" (City Edition). Applicants respectfully submit that dependent claims 18 and 26 are allowable, since they depend on allowable claims 1 and 15. Thus, Applicants restfully request that this rejection be reconsidered and withdrawn.

The present amendment is submitted in accordance with the provisions of 37 C.F.R. §1.116, which after Final Rejection permits entry of amendments placing the claims in better form for consideration on appeal. As the present amendment is believed to overcome outstanding rejections under 35 U.S.C. § 102 and § 103, the present amendment places the application in better form for consideration on appeal. It is therefore respectfully requested that 37 C.F.R. §1.116 be liberally construed, and that the present amendment be entered.

In view of the foregoing, it is submitted that the present application is in condition for allowance and a notice to that effect is respectfully requested. If, however, the Examiner deems that any issue remains after considering this response, the Examiner is invited to contact the undersigned attorney to expedite the prosecution and engage in a joint effort to work out a mutually satisfactory solution. **Except** for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§ 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 19-2380. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully submitted,

NIXON PEABODY, LLP

Date: August 4, 2006

/Stephen M. Hertzler, Reg. # 58,247/
Stephen M. Hertzler

Customer No.: 22204
NIXON PEABODY LLP
401 9th Street, N.W., Suite 900
Washington, D.C. 20004-2128
(202) 585-8000